LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Electric Fishes.

WHILE I was fishing for cod the other day off Walmer, I took up in my hand a small whiting pout that was flopping about in the bottom of the boat, when I received what appeared to me a slight though distinct electric shock in the palm of my hand, which made me exclaim at once, "That fish has given me an electric shock." On asking the fisherman (seventy years of age) if he had known of such a thing occurring before, he said that he had "heard tell of it," and on inquiring further I found that he was referring to whiting pout and not to any other fish. He had never, however, noticed anything of the kind himself.

It will be interesting to know if any of your correspondents can confirm the observation. W. H. CORFIELD.

Savile Row, W., September 22.

Sonorous Sands.

THE communication of Mr. Cecil Carus-Wilson in NATURE of August 30 (p. 415), induces us to state that we are rapidly bringing to completion, and preparing for publication, an exhaustive study of "Sea, Lake, River, and Desert Sands" in their geological, physical, and chemical aspects. Our researches have extended over a period of six years, and are based on studies made in the field, in the laboratory, and with the microscope, and will be found to embrace many novel facts and original views. We have collected in person, by correspondence, and with the aid of the Life Saving Service of the United States, and of the Smithsonian Institution, several hundred specimens of sands and silts from localities in America, Europe, Africa, and Asia: these we have subjected to systematic examination and have tabulated the results.

The interesting phenomena of "musical sands," so called, have also been made special objects of our investigations, resulting in the discovery of many new localities, and of novel properties, as well as of the circumstances connected with the origin, production, and extinction of the sonorous qualities from which these sands receive their name. Furthermore, we have traced the history of musical sands through the literature of many centuries, and have brought together from widely scattered sources memoirs and notices of both scientific and popular interest. Throughout our work the bibliography of the subject has not been neglected, and we have availed ourselves of the photographic art for the purposes of illustration. We beg leave to make this preliminary announcement because our researches have been lengthened far beyond our expectations, and their publication (save in a few abstracts in the Proceedings of the American Association for the Advancement of Science) unavoidably delayed.

With regard to the occurrence of musical sand in Europe, the existence of which is unknown to Mr. Carus-Wilson, we may add that we have specimens from various localities, and the literature of the subject is accessible to everyone.

H. CARRINGTON BOLTON.
ALEXIS A. JULIEN.

London and New York, September 1.

YOUR correspondent in NATURE of the 30th ult. (p. 415), mentions a sea-beach in Dorsetshire as the only place in the Kingdom, besides the Island of Eigg, where "musical" sand is known to occur. This summer I found the sand in Lunan Bay (Forfarshire) to be distinctly sonorous. The sound occurred on moving the foot across the sand, or moving a walking-stick or the finger. The sound was little inferior to that in Eigg. The attention of a fisherman having been directed to the circumstance, he informed me they were quite aware of the occurrence, and that the sound was frequently much louder than on the day I was there; depending, I presume, on the state of the sand and of the atmosphere. He also mentioned that the sound occurs in the sand of Montrose Bay. I observed that the best result was got where the sand was moderately dry, and that little or no effect was produced with such a greater degree of moisture as gave a good result in Eigg. The form and composition of the sand-grains differ considerably in the two localities. It seems probable that sand of this character occurs in more localities than hitherto supposed. K.

Torquay, September 8.

THE LATE ARTHUR BUCHHEIM.

I HAVE been requested, and feel it a melancholy satisfaction, to notice in the columns of NATURE the premature decease on the 9th inst., at the age of twenty-nine, of Mr. Arthur Buchheim, for many years Mathematical Master at the Manchester Grammar School.

He was educated at the City of London School, whence he proceeded to Oxford, and gained an open Scholarship at New College there. He was a favourite pupil of the late Henry Smith, my distinguished predecessor in the Savilian Professorship of Geometry, who always spoke of him as the most promising young mathematician that had appeared in the University of Oxford for a long series of years. I am not able to speak of his earlier work as an original investigator, but know and value highly his contributions to the great subject which engaged the principal part of my own attention during the transition period between my residence in Baltimore and at Oxford, and to which I have given the name of Universal Algebra. He was a man of singular modesty and goodness of heart, which made him beloved by all who were brought into connection with him. Had his life been spared, I think we may safely say of him what Newton said of Horrocks, that "we should have known something" of what may now probably remain long unknown.

His life, it is to be feared, may have been shortened by his intense application to study, as after the arduous labour of the day he would sit up at night to study languages such as Sanskrit, Persian, Chinese, and Russian, almost any one of which was sufficient in itself to occupy his undivided attention.

After leaving Oxford he studied for some time under Prof. Klein at Leipzig. This episode in his life no doubt contributed to widening his intellectual horizon, but at the same time had the unfortunate effect of getting him out of the style of ordinary English University Examinations, in consequence of which he abstained, although strongly pressed by the authorities to do so, from offering himself as a candidate for a vacant Fellowship at the College of which he was a Scholar.

He comes of an intellectual stock, his father being the well-known Prof. C. A. Buchheim, of King's College, London.

Up to the last, after he had been obliged from ill health to resign his appointment at Manchester, he continued in harness, and made a communication to the London Mathematical Society at the monthly meeting in May or June last.

I have been furnished with a list of his published papers, fourteen in number, up to the year 1885 (exclusive), of which four appeared in the Proceedings of the London Mathematical Society, eight in the Cambridge *Messenger of Mathematics*, one in the *American Journal of Mathematics*, and one (November 1884) in the *Philosophical Magazine*. This last was entitled, "On Prof. Sylvester's Third Law of Motion," with which, I regret to say, I was previously unacquainted.

"The three laws of motion" of which it forms one were formulated by me in one of the Johns Hopkins Circulars, and it is a proof of the keenness of his research, that the subject of this notice (probably the only mathematician in Europe) should have made himself so well acquainted with them as to be able to write an independent paper on the subject. They have no direct connection (except in a Hegelian[1] sense) with mechanical principles, but are

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[1] By which I mean that sense according to which motion in space is to be regarded as only a particular (visualized) instance of change *in actu*.

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three cardinal principles in my Theory of Universal Algebra, between which and Newton's Three Laws of Motion I considered that I had succeeded in establishing a one-to-one correspondence. J. J. SYLVESTER.

Athenæum Club, September 22.

THE BRITISH ASSOCIATION.

SECTION H.

ANTHROPOLOGY.

OPENING ADDRESS BY LIEUTENANT-GENERAL PITT-RIVERS, D.C.L., F.R.S., F.G.S., F.S.A., PRESIDENT OF THE SECTION.

I.

HAVING been much occupied up to within the last week in my own special branch of anthropology, and in bringing out the second volume of my excavations in Dorsetshire, which I wished to have ready for those who are interested in the subject on the occasion of this meeting, I regret that I have been unable to prepare an address upon a general subject as I could have wished to do, and am compelled to limit my remarks to matters on which I have been recently engaged. Also, I wish to make a few observations on the means to be taken to promulgate anthropological knowledge and render it available for the education of the masses.

Taking the last-mentioned subject first, I will commence with anthropological museums, to which I have given attention for many years. In my judgment, an institution that is dedicated to the Muses should be something more than a store, it should have some backbone in it. It should be in itself a means of conveying knowledge, and not a mere repository of objects from which knowledge can be culled by those who know where to look for it. A national museum, created and maintained at the public expense, should be available for public instruction, and not solely a place of reference for *savants*.

I do not deny the necessity that exists for museum stores for the use of students, but I maintain that, side by side with such stores, there should in these days exist museums instructively arranged for the benefit of those who have no time to study, and for whom the practical results of anthropological and other, scientific investigations are quite as important as for *savants*.

The one great feature which it is desirable to emphasize in connection with the exhibition of archæological and ethnological specimens is evolution. To impress upon the mind the continuity and historical sequence of the arts of life, is, without doubt, one of the most important lessons to be inculcated. It is only of late years that the development of social institutions has at all entered into the design of educational histories. And the arts of life. so far as I am aware, have never formed part of any educational series. Yet as a study of evolution they are the most important of all, because in them the connecting links between the various phases of development can be better displayed.

The relative value of any subject for this purpose is not in proportion to the interest which attaches to the subject in the abstract. Laws, customs, and institutions may perhaps be regarded as of greater importance than the arts of life, but for anthropological purposes they are of less value, because in them, previously to the introduction of writing, the different phases of development, as soon as they are superseded by new ideas, are entirely lost and cannot be reproduced except in imagination. Whereas in the arts of life, in which ideas are embodied in material forms, the connecting links are in many cases preserved, and can be replaced in their proper sequence by means of antiquities.

For this reason the study of the arts of life ought always to precede the study of social evolution, in order that the student may learn to make allowance for missing links, and to avoid sophisms and the supposition of laws and tendencies which have no existence in reality.

To ascertain the true causes for all the phenomena of human life is the main object of anthropological research, and it is obvious that this is better done in those branches in which the continuity is best preserved.

In the study of natural history, existing animals are regarded as present phases in the development of species, and their value to the biological student depends, not so much on their being of the highest organism, as on the palæontological sequence by which their history is capable of being established. In the same way existing laws, institutions, and arts, wherever they are found in their respective stages of perfection, are to be regarded simply as existing strata in the development of human life, and their value from an anthropological point of view depends on the facilities they afford for studying their history.

If I am right in this view of the matter, it is evident that the arts of life are of paramount importance, because they admit of being arranged in cases by means of antiquities in the order in which they actually occurred, and by that means they serve to illustrate the development of other branches which cannot be so arranged, and the continuity of which is therefore not open to visual demonstration for the benefit of the unlearned.

It is now considerably over thirty years since I first began to pay attention to this subject. Having been employed in experimenting with new inventions in fire-arms, submitted to H.M. Government in 1852–53, I drew up in 1858 a paper which was published in the *United Service Journal*, showing the continuity observable in the various ideas submitted for adoption in the army at that time.

Later, in 1867–68–69, I published three papers, which, in order to adapt them to the institution at which they were read, I called "Lectures on Primitive Warfare," but which, in reality, were treatises on the development of primitive weapons, in which it was shown how the earliest weapons of savages arose from the selection of natural forms of sticks and stones, and were developed gradually into the forms in which they are now used. I also traced the development of the forms of implements of the Bronze Age and their transition into those of the Iron Age. These papers were followed by others on the same subject read at the Royal Institution and elsewhere, relating to the development of special branches, such as early modes of navigation, forms of ornament, primitive locks and keys, the distribution of the bow, and its development into what I termed the *composite* bow in Asia and America, and other subjects.

Meanwhile I had formed a museum, in which the objects to which the papers related were arranged in developmental order. This was exhibited by the Science and Art Department at Bethnal Green from 1874 to 1878, and at South Kensington from that date to 1885; and a catalogue *raisonné* was published by the Department, which went through two editions. After that, wishing to find a permanent home for it, where it would increase and multiply, I presented it to the University of Oxford, the University having granted £10,000 to build a museum to contain it. It is there known as the "Pitt-Rivers Collection," and is arranged in the same order as at South Kensington. Prof. Moseley has devoted much attention to the removal and re-arrangement of it up to the time of his recent, but I trust only temporary, illness, which has been so great a loss to the University, and which has been felt by no one connected with it more than by myself, for whilst his great experience as a traveller and anthropologist enabled him to improve and add to it, he has at the same time always shown every disposition to do justice to the original collection. Since Prof. Moseley's illness it has been in the charge of Mr. H. Balfour, who, I am sure, will follow in the steps of his predecessor and former chief, and will do his best to enlarge and improve it. He has already added a new series in relation to the ornamentation of arrow stems, which has been published by the Anthropological Institute. It appears, however, desirable that the same system should be established in other places, and with that view I have for some time past been collecting the materials for a new museum, which, if I live long enough to complete it, I shall probably plant elsewhere.

Before presenting the collection to Oxford I had offered it to the Government, in the hope that it might form the nucleus of a large educational museum arranged upon the system of development which I had adopted. A very competent Committee was appointed to consider the offer, which recommended that it should be accepted, but the Government declined to do so: one of the reasons assigned being that some of the authorities of the British Museum thought it undesirable that two ethnographical museums should exist in London at the same time; this, however, entirely waives the question of the totally different objects that the two museums (at least that part of them which relates to ethnographical specimens) are intended to serve.

The British Museum, with its enormous treasures of art, is itself only in a molluscous and invertebrate condition of development. For the education of the masses it is of no use whatever.

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